

## CLAIMS

We claim:

5           1.       A kit comprising a non-amplified oligonucleotide detection assay configured for detecting at least one CFTR allele.

          2.       The kit of Claim 1, wherein said non-amplified oligonucleotide detection assay comprises first and second oligonucleotides configured to form an invasive  
10 cleavage structure in combination with a target sequence comprising said at least one CFTR allele.

          3.       The kit of Claim 2, wherein said first oligonucleotide comprises a 5' portion and a 3' portion, wherein said 3' portion is configured to hybridize to said target  
15 sequence, and wherein said 5' portion is configured to not hybridize to said target sequence.

          4.       The kit of Claim 2, wherein said second oligonucleotide comprises a 5' portion and a 3' portion, wherein said 5' portion is configured to hybridize to said target  
20 sequence, and wherein said 3' portion is configured to not hybridize to said target sequence.

          5.       The kit of Claim 1, wherein said at least one CFTR allele is selected from the group consisting of 2789+5G>A, R1162X, R560T, 1898+1G>A, delI507, I148T,  
25 A455E, or the wild-type versions thereof.

          6.       The kit of Claim 1, wherein said at least one CFTR allele comprises 2789+5G>A, R1162X, R560T, 1898+1G>A, delI507, I148T, and A455E.

7. The kit of Claim 1, wherein said at least one CFTR allele is selected from the group consisting of 3120+1G>A, 3659delC, G551D, N1303K, 1078delT, R334W, 711+1G>T, 3849+10kb, or the wild-type versions thereof.

5 8. The kit of Claim 1, wherein said at least one CFTR allele comprises 3120+1G>A, 3659delC, G551D, N1303K, 1078delT, R334W, 711+1G>T, and 3849+10kb.

9. The kit of Claim 1, wherein said at least one CFTR allele is selected from the group consisting of 621+1G>T, W1282X, 1717-1G>A, R117H, or the wild-type versions thereof.

10 10. The kit of Claim 1, wherein said at least one CFTR allele comprises 621+1G>T, W1282X, 1717-1G>A, and R117H.

15 11. The kit of Claim 1, wherein said at least one CFTR allele is selected from the group consisting R347P, G85E, G542X, R553X, or the wild-type versions thereof.

12. The kit of Claim 1, wherein said at least one CFTR allele comprises 20 R347P, G85E, 2184delA, G542X, or R553X.

13. The kit of Claim 1, wherein said at least one CFTR allele comprises 2184delA.

25 14. The kit of Claim 1, wherein said at least one CFTR allele comprises ΔF508 or the wild-type version thereof.

15. The kit of Claim 1, wherein the at least one CFTR allele comprises D1270N, V520F, R347H, 394delTT, 3S549N, or D1152H or the wild type versions thereof.

16. The kit of Claim 1, wherein the at least one CFTR allele comprises 3905insT, Y1092X C>G, 3949+4A>G, 3876delA, Q493X, G551D, R553X, R1162X, S549R A>C, S549R T>G, F508C, Y1092X C>A, ΔI507, IVS-8 5T/7T/9T, Y122X, or 1898 +1 G>A.

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17. A kit comprising oligonucleotide detection assays configured for detecting a set of CFTR alleles, wherein said set is selected from:

- a) a first set comprising 2789+5G>A, R1162X, R560T, 1898+1G>A, delI507, I148T, and A455E;
- 10 b) a second set comprising 3120+1G>A, 3659delC, G551D, N1303K, 1078delT, R334W, 711+1G>T, and 3849+10kb
- c) a third set comprising 621+1G>T, W1282X, 1717-1G>A, and R117H;
- d) a fourth set comprising R347P, G85E, G542X, and R553X; and
- 15 e) a fifth set comprising 2184delA.

18. The kit of Claim 17, wherein said fifth set comprises 2184delA or the wild type version thereof.

20 19. The kit of Claim 17, wherein said oligonucleotide detection assays comprise first and second oligonucleotides configured to form an invasive cleavage structure in combination with target sequences comprising said CFTR alleles.

25 20. The kit of Claim 19, wherein said first oligonucleotide comprises a 5' portion and a 3' portion, wherein said 3' portion is configured to hybridize to said target sequence, and wherein said 5' portion is configured to not hybridize to said target sequence.

30 21. The kit of Claim 19, wherein said second oligonucleotide comprises a 5' portion and a 3' portion, wherein said 5' portion is configured to hybridize to said target

sequence, and wherein said 3' portion is configured not to hybridize to said target sequence.

22. A kit comprising oligonucleotide detection assays configured for detecting  
5 a set of CFTR alleles, wherein said set is selected from:

a) a first set comprising 2789+5G>A, R1162X, R560T, 1898+1G>A, delI507, I148T, and A455E;

b) a second set comprising 3120+1G>A, 3659delC, G551D, N1303K, 1078delT, R334W, 711+1G>T, and 3849+10kb;

10 c) a third set comprising 621+1G>T, W1282X, 1717-1G>A, and R117H; and

d) a fourth set comprising R347P, G85E, 2184delA, G542X, and R553X.

15 23. The kit of Claim 22, wherein said oligonucleotide detection assays comprise first and second oligonucleotides configured to form an invasive cleavage structure in combination with target sequences comprising said CFTR alleles.

24. The kit of Claim 1, wherein said at least one CFTR allele is 3199del6.

20 25. The kit of Claim 1, wherein said oligonucleotide detection assay comprises first and second oligonucleotides configured to form an invasive cleavage structure in combination with a target sequence comprising said CFTR allele or the wild type version thereof.

25 26. The kit of Claim 1, wherein said at least one CFTR allele comprises 2183AA>G or the wild-type version thereof.

27. The kit of Claim 26, wherein said oligonucleotide detection assay  
30 comprises first and second oligonucleotides configured to form an invasive cleavage

structure in combination with a target sequence comprising said CFTR allele or the wild type version thereof.

28. A method for detecting a plurality of CFTR alleles, comprising:

- a) providing a sample comprising CFTR target nucleic acid;
- b) amplifying said CFTR target nucleic acid with 25 cycles or fewer of a polymerase chain reaction to generate amplified target nucleic acid; and
- c) exposing said amplified target nucleic acid to a plurality of detection assays configured to detect a plurality of CFTR alleles under conditions such that the presence or absence of said CFTR alleles is detected.

29. The method of Claim 28, wherein said plurality of CFTR alleles comprise twenty or more different CFTR alleles.

30. The method of Claim 28, wherein said plurality of CFTR alleles comprise thirty or more different CFTR alleles.

31. The method of Claim 28, wherein said polymerase chain reaction is conducted for 20 cycles or less.

32. The method of Claim 28, wherein said polymerase chain reaction is conducted for 17 cycles or fewer.

33. The method of Claim 28, wherein said amplifying is conducted within a single reaction vessel.

34. The method of Claim 28, wherein said amplifying and exposing are conducted simultaneously.

35. The method of Claim 28, wherein said detection assays comprise invasive cleavage assays.